

WHAT IS CLAIMED:

1. A coalescing surface for inclusion into an element of a fuel cell system comprising a vaulted wall having a domed shape.
2. A coalescing chamber for a fuel cell system comprising a substantially closed container having an inlet for receiving effluent produced in a fuel cell and a coalescing surface comprising a wall having a domed shape.
3. A fuel cell system comprising:
 - a housing defining an anode chamber and a cathode chamber and including a catalyst, a protonically conductive but electronically non-conductive membrane positioned between said anode chamber and said cathode chamber;
 - a mixing pump;
 - a fuel chamber in fluid communication with said mixing pump;
 - a first conduit having a first end connected to said anode chamber and a second end connected to said mixing pump, said first conduit for directing a fuel-water solution from said mixing pump to said anode chamber;
 - a second conduit having a first end connected to said anode chamber and a second end connected to said mixing pump, said second conduit for directing effluent from said anode chamber to said mixing pump; and
 - a coalescing surface for collecting effluent gas from said effluent received from one of said anode chamber and said cathode chamber.
4. The apparatus according to claim 3, wherein said coalescing surface is provided on a portion of a wall of said second conduit, for collecting effluent gas from said effluent received from said anode chamber.
5. The apparatus according to claim 3, wherein said coalescing surface is provided on a

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portion of a wall of said first conduit, for collecting effluent gas from said effluent received from said cathode chamber.

6. The fuel cell system according to claim 3, wherein said coalescing surface includes a vaulted shape.
7. The fuel cell system according to claim 4, wherein said vaulted shape includes a dome.
8. The fuel cell system according to claim 3, wherein said second conduit includes a vent provided adjacent said coalescing surface.
9. The fuel cell system according to claim 5, wherein said second conduit includes a vent provided adjacent said coalescing surface.
10. The fuel cell system according to claims 8 or 9, wherein said vent includes a first opening positioned at a base of said coalescing surface and a second opening provided above an uppermost portion of said coalescing surface.
11. The fuel cell system according to claim 3, wherein said system is used in conjunction with a bipolar stack.
12. The fuel cell system according to claim 3, wherein said system is used in conjunction with a plurality of protonically conductive membranes.
13. The fuel cell system according to claim 12, wherein said plurality of protonically conductive membranes are assembled substantially in a single plane.
14. The fuel cell system according to claim 3, wherein said coalescing surface is provided in a coalescing chamber, said chamber placed in-line with a conduit.
15. The fuel cell system according to claim 3, wherein said coalescing surface is provided on a surface of at least one of said anode chamber and said cathode chamber.
16. A method for separating gas from effluent produced in an anode or a cathode

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chamber of a fuel cell system, said system comprising:

a housing defining an anode chamber and a cathode chamber and including a catalyst, a protonically conductive but electronically non-conductive membrane positioned between said anode chamber and said cathode chamber;

a fuel chamber for providing fuel to a fuel mixture for supplying said anode chamber;

a mixing chamber in fluid communication with said fuel chamber, said mixing chamber for mixing fuel received from said fuel chamber and water to form a fuel mixture for supplying to said anode chamber;

a conduit having a first end connected to one of said anode chamber and said cathode chamber and a second end connected to said mixing chamber, said conduit for directing effluent produced in said respective chamber to said mixing chamber; and

a coalescing surface for collecting effluent gas from effluent produced in said fuel cell;

said method comprising:

passing effluent produced in said fuel cell adjacent said coalescing surface;
and

collecting gas from said effluent adjacent said coalescing surface.

17. The method according to claim 16, further comprising venting said collected gas when a volume of said collected gas reaches a predetermined amount, said collected gas being vented through a vent provided adjacent said coalescing surface.
18. A fuel cell system comprising:

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a housing defining an anode chamber and a cathode chamber and including a catalyst, a protonically conductive but electronically non-conductive membrane positioned between said anode chamber and said cathode chamber;

a mixing chamber;

a fuel chamber in fluid communication with said mixing chamber;

a first conduit having a first end connected to said anode chamber and a second end connected to said mixing chamber, said first conduit for directing a fuel-water solution from said mixing chamber to said anode chamber;

a second conduit having a first end connected to said anode chamber and a second end connected to said mixing chamber, said second conduit for directing effluent from said anode chamber to said mixing chamber;

a first coalescing chamber containing a first coalescing surface for collecting effluent gas from said effluent received from said anode chamber;

a second coalescing chamber including a second coalescing surface for collecting effluent gas from said effluent received from said cathode chamber;

a first vent provided adjacent said first coalescing surface; and

a second vent provided adjacent said second coalescing surface.

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